INDOOR AIR MONITOR
Indoor Air Management Newsletter
Volume 10, No.3--July 2002

Naval Facilities Engineering Service Center
Environmental Department
NAVOSH Air Branch
Port Hueneme, California 93043

****

TABLE OF CONTENTS

****

SPONSORING INDUSTRIAL VENTILATION COURSES

NFESC has successfully completed its FY02 Industrial Ventilation (IV) training schedule in San Diego, CA; Chesapeake, VA; and Pensacola, FL. To prepare for FY03, we are looking for sponsors for either of our industrial ventilation courses. There is no cost to sponsor the training. Sponsoring activities will coordinate registration and provide a classroom (for about 25 students), and a testing site, preferably a woodshop with a ventilation system. Classes are free to all DOD personnel, with priority given to Navy and Marine Corps personnel. The students' commands are responsible for their travel expenses and per diem. If your activity wants to sponsor one of the IV courses below, contact Tuan Nguyen at DSN 551-5311, (805) 982-5311, or via e-mail at nguyenth@nfesc.navy.mil.

1**. IV Design, Testing, and Troubleshooting:** This 4.5-day course provides students with fundamental principles of industrial ventilation design and testing. The design section focuses on system designing and balancing. Students will spend the first part of the course doing calculations on different design problems. The testing section includes a variety of commonly used measurement devices, methods, and procedures in IV system testing. The troubleshooting section includes techniques for inspecting and evaluating IV systems. The course consists of lectures, discussions, design problems, videos, and slide presentations. Students also will have a hands-on opportunity to try various testing instruments and apply different testing methods in a field exercise. This is a complete course for engineering designers; ROICC and SUPSHIP personnel; mid to upper level industrial hygienists; and safety professionals whose work involves system design and balancing, design review, testing, and troubleshooting. Attendees will receive 4.5 certified industrial hygienist (CIH) maintenance points.

2. IV Testing and Troubleshooting: This 2.5-day course is the testing and troubleshooting part of the Design, Testing, and Troubleshooting Course. It provides participants with the

fundamental knowledge required to test an IV system. Target audience includes facility engineers; maintenance personnel; ROICC tech reps; SUPSHIP designers; and entry to mid level industrial hygienists and safety personnel who test, monitor, and maintain IV systems. Attendees will receive 2 CIH maintenance points.

****

IAM CONNECTION

IAM, in regard to Paragraph 2 in the article "Velocity--Higher is Not Always Better" (IAM, Vol 10, No. 2), if the function of the slot is to provide equal distribution across the face of the hood, as stated in Paragraph 1, for a multi-slotted hood, wouldn't the area (A) in the formula, Q=(10X2 + A)V, be the area defined by the top and bottom slots of a multi-slotted hoods? It seems to me that a five-slotted hood with slots 60 inches long and 1 inch wide spaced, 1 inch apart would generate a different capture velocity than a similar hood with the 5 slots, spaced 10 inches apart. Rodney Okaneku

RODNEY, you are right--although slot velocity does not have an effect on capture velocity, the location of the slots does. From the formula Q=V(10X2 + A), (that's X squared) for a constant flow rate Q, changing the area A will also change capture velocity V. The best way to design a hood is to first figure out the space in front of the hood that we will need to do our work. Then use that space to set our ventilated area A. With V as the required capture velocity, calculate the required flow rate for our hood using the above formula. Finally, use the calculated flow rate Q to size the slot area and number of slots to provide a recommended slot velocity of 2,000 fpm. In summary, the important part is to locate the slots right in front of the contaminant sources. The designer's decision on the size of the hood and the location of the slots must be based on his/her knowledge on the actual work process.

IAM, where can I obtain a copy of the ventilation handbook MIL-HDBK-1191? Also, do you have guidance on adequate ventilation for photo lab darkroom. We base ventilation adequacy on air sample results (e.g., acetic acid) per IHFOM NEHC-TM 6290.91-2 Rev. B. Jeff Miner

JEFF, you can find MIL-HDBK 1191 at
http://www.efdlant.navfac.navy.mil/Lantops_15/documents/MH/1191.pdf
We found the following publications with good information on photo lab ventilation:

1. "Indoor Air Quality and Ventilation in Photographic Processing Facilities" at the Kodak web page http://www.kodak.com/US/en/corp/environment/kes/pubs/index.jhtml.
2. "Photographic Processing Hazard" at the Ilford web page http://www.ilford.com/html/us_english/msds/PhotoHealth/photohe2.html.

IAM, in general ventilation, is the flow rate Q in the formula used for calculating air change per hour (ACH = Q x 60/Volume) always the exhaust flow rate?

READER, ACGIH specifies the same air change per hour (ACH) for both exhaust and supply, and then adds Q (exhaust) = 1.05 Q (supply). To create a negatively pressurized room, you can either consider Q as the exhaust rate, then calculate the supply air to be ~95% of the exhaust, or to be more conservative, consider Q as supply flow rate and calculate the exhaust flow rate at 105% of that value. The second choice gives you a little more airflow.

IAM, when a standard specifies "a total ventilation flow rate of 10 ACH," does it mean the total of exhaust and supply flow rates?

READER, a ventilation rate is either specified for exhaust or supply, but not for a total of both. When a standard specifies a required "total flow rate," it means the total of all fans, either exhaust or supply, serving one room (see the previous question on ACH).
****

ASHRAE Publishes Guidance on Laboratory Design

The unique HVAC needs of laboratories can pose problems for design engineers, architects, and owners who have experience mainly in typical commercial buildings.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) *ASHRAE Laboratory Design Guide* provides owners, designers, contractors, and operators with information on the requirements for achieving high quality laboratory facilities. The design guide can be used for the design, troubleshooting, and operation of laboratory facilities or as a comprehensive reference. Examples of HVAC design issues specific to laboratories include additional codes and standards, health risks, more complicated systems, and varying system conditions.

The Guide progresses from project inception through operations and includes chapters on laboratory planning, the design process, exhaust hoods, primary air systems, process cooling, air treatment, exhaust stack design, energy recovery, controls, airflow patterns and air balance, operation and maintenance, the laboratory commissioning process, HVAC system economics, and microbiological and biomedical laboratories.

The cost of *ASHRAE Laboratory Design Guide* is $87 ($69, ASHRAE members). To order, contact ASHRAE Customer Service at 1-800-527-4723 (United States and Canada) or 404-636-8400 (worldwide), fax 404-321-5478, by mail at 1791 Tullie Circle NE, Atlanta, GA 30329, or visit the ASHRAE Online Bookstore at http://www.ashrae.org.

ASHRAE, founded in 1894, is an international organization with 55,000 members. Its sole objective is to advance the arts and sciences of heating, ventilation, air conditioning, and refrigeration through research, standards writing, publishing and continuing education, to serve the evolving needs of the public.
****

EXPOSURE TO BERYLLIUM IN DENTAL LABS

A new Hazard Information Bulletin issued by the Occupational Safety and Health Administration (OSHA) alerts dental laboratories on how to prevent exposure to beryllium, which can cause chronic beryllium disease (CBD), a debilitating and often fatal lung disease, or lung cancer.

"Inhaling Beryllium dust at some concentrations is extremely hazardous-sometimes deadly," said OSHA Administrator John Henshaw. "We are concerned that dental lab technicians are continuing to contract the disease associated with Beryllium exposure. This bulletin informs

dental labs and workers of the potential hazards and offers effective methods to prevent exposure to beryllium."

The Hazard Information Bulletin presents a case of CBD recently diagnosed in a dental lab technician and recommends the types of engineering controls, work practices, training, personal protective equipment and housekeeping procedures that can be used to reduce beryllium exposure and the CBD risk. It also provides information on a health surveillance tool that can be used to identify workers with CBD, or beryllium-sensitized individuals, who are at a high risk of progressing to CBD.

Dental laboratory technicians can develop CBD if they inhale dust containing beryllium when working on items such as dental crowns, bridges, and partial denture frameworks made from dental alloys containing beryllium. CBD may develop within months after initial exposure to beryllium or may have a very slow onset and not develop until years after the beryllium exposure.

Not all dental alloys contain beryllium. Dental laboratories and technicians should inquire about the contents of the alloys they are using. Information about the contents of dental alloys can be found in the Material Safety Data Sheets (MSDS) that accompany these products to the dental laboratory.

Under OSHA's current beryllium standard, employees cannot be exposed to more than two micrograms of beryllium per cubic meter of air for an 8-hour time-weighted average. Recent information suggests that compliance with this exposure limit is not adequate for preventing CBD. The Hazard Information Bulletin calls for the use of improved engineering controls and work practices to the fullest extent feasible.

The Hazard Information Bulletin underwent an extensive review process, both inside and outside the agency. The bulletin and more information on beryllium are available on the OSHA web site at www.osha.gov.

****

OSHA VIDEO LOAN PROGRAM

OSHA has limited quantities of selected videos, available as free loans. The program provides customers with a maximum of two videotapes per request. Customers can keep the videos for one week. The videos and any printed material sent with the video have no copyright restrictions and may be copied. The videos listed below are available for ordering online at http://www.osha.gov/Publications/video/video.html.

1. OSHA At Work **(**22 minutes, 1990). Looks at the history of and need for OSHA. Presents an overview of OSHA's many programs.

2. Protecting Workers: How OSHA Conducts Inspections (18 minutes, 1994). Follows a typical workplace inspection, discusses the different types of inspections, what triggers inspections, penalties, and employers' rights to appeal citations.

3. Protecting Workers: How OSHA Writes Standards (12 minutes, 1992). Discusses the

processes and steps OSHA takes developing a safety or health standard.

4. Partner With OSHA: New Ways of Working (11 minutes, 1999). Highlights the reduction in injury, death and lost-workday successes of six companies.

5. Crane Safety for Site Superintendents (8 minutes, 1992). Discusses some of the hazards and risks involved in crane operations. Targeted to managers and construction site supervisors.

6. A Basic Look at Scaffolds for Compliance Officers (18 minutes, Revised 2/2000). Looks at some of the most commonly used types of scaffolds, associated hazards, and erection procedures.

7. Construction Safety: Choice Or Chance (15 minutes, 1995). Highlights the four leading causes of fatalities on construction sites and stresses the responsibility for safety as a joint effort of government, management, and employees.

8. Ergonomic Programs That Work (21 minutes, 1998). Shows how several companies resolved ergonomic problems in their workplace, resulting in higher productivity and lower lost workdays.

9. Nursing Homes: Hazards And Solutions (16 minutes, 1998). Discusses various hazards in nursing homes, focusing on resident transfer hazards, and controls to minimize these hazards.

10. As It Should Be Done: Workplace Precautions Against Blood Borne Pathogens (24 minutes, 1992). Explains how workers can protect themselves against occupational exposure to blood borne pathogens, such as Hepatitis B Virus (HBV) and the Human Immunodeficiency Virus (HIV). This program is targeted primarily to health care workers and related professionals.

11. Servicing Multi-Piece RIM WHEELS (10 minutes, 1985). Dramatizes what can happen when changing multi-piece rim wheels. Focuses on the safety steps that should be taken to avoid serous injury or loss of life.

12. Ground-Fault Protection at Construction Sites (14 minutes, 1982). How to help prevent construction site electrocution with proper installation of ground fault protection units.

13. Industrial Noise (10 minutes, 1983). Shows how one manufacturing company engineered out its noise problems.

****

The Indoor Air Monitor is published quarterly by the NAVOSH Air Branch (http://enviro.nfesc.navy.mil/esc425/NoshArBr.htm), Environmental Department, of the Naval Facilities Engineering Service Center (http://www.nfesc.navy.mil/). The views and opinions expressed in this publication are not necessarily those of the Department of the Navy. Send information, comments, or ideas via e-mail to: iam@nfesc.navy.mil. Please include your name, mailing address, e-mail address, DSN and commercial telephone number.

****